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# Project Summary

# Intrauterine Exposure of Humans to PCBs: Newborn Effects

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**The effect of low-level chronic exposure to polychlorinated biphenyls (PCBs) from consumption of Lake Michigan fish was assessed in pregnant women and their newborn offspring. Low levels of PCBs remain in the human body for some time and caused, in this sample, decreases in birth weight, head circumference, and gestational age of the newborn. PCBs appeared to be transmitted to the infants before birth, through the maternal serum, and after birth, through breast milk. Behavioral deficiencies were observed in the infants exposed to PCBs both in autonomic immaturity and depressed responsiveness.**

***This Project Summary was developed by EPA's Environmental Research Laboratory, Duluth, MN, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information).***

## Introduction

Two groups of humans are particularly at risk from low-level, chronic exposure to PCBs—pregnant women and their newborn offspring. Exposure in this study was limited to consumption of PCB-contaminated fish from Lake Michigan. The sample included 313 infants and their mothers from three hospitals in Grand Rapids and Muskegon. The controls were mothers who reported no consumption of Lake Michigan fish. The women in the experimental group had consumed at least 11.8 Kg of Lake Michigan fish in the last six years.

Specific relationships examined in the study were:

1. Quantity of fish consumed and elevated maternal body burden of PCBs. Fish consumption calculations contained a weighting factor to correct for different PCB content of different fish. Three measures of fish consumption were applied—annual rate of consumption, cumulative consumption, and consumption during pregnancy.
2. PCBs in maternal serum and neonatal cord serum. PCBs were determined by gas chromatography.
3. Three measures of exposure (fish consumption, maternal serum, cord serum) and newborn status. Newborn status assessment included birth weight, crown-heel length, head circumference, gestational age (two methods), behavioral assessment of neonatal functioning, and a number of measures of maternal and infant health. These are summarized in the model illustrated in Figure 1.

## Conclusions

Intrauterine exposure to PCBs is most clearly associated with reduced birth size and a shorter gestation period. The most highly exposed infants in this sample were about 200 to 250 g lighter than the nonexposed controls, whether exposure was measured by maternal fish consumption or cord serum PCB levels. Similar effects were seen for head circumference and gestational age. All three measures

decreased in a dose-related fashion with increasing levels of PCB exposure.

PCB-contaminated fish consumption also predisposes toward neonatal behavioral deficits, including (1) autonomic immaturity, as indicated by a greater propensity to startle, and poor motor, reflex, and neuromuscular functioning; and (2) depressed responsiveness, as indicated by a greater number of hypoactive reflexes and more limited lability of state.

The association between consumption of contaminated fish and neonatal behavioral deficits was not corroborated by the cord serum measure of PCB exposure. This may be due, in part to poor reliability of the cord serum measure and poor availability of this measurement.

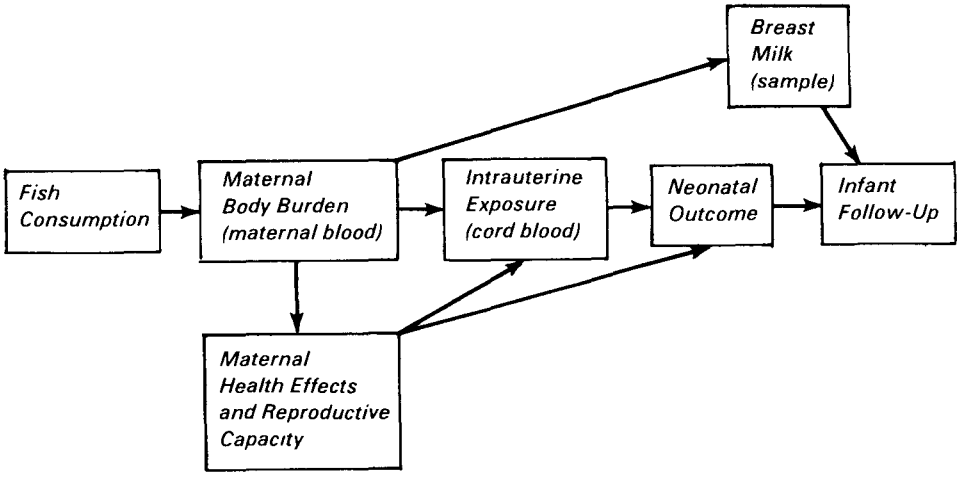


***Figure 1.*** *Model of pre- and postnatal exposure to PCBs by ingestion of contaminated fish.*

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*The complete report, entitled "Intrauterine Exposure of Humans to PCBs: Newborn Effects," (Order No. PB 84-188 887; Cost: $11.50, subject to change) will be available only from:*

*National Technical Information Service*
*5285 Port Royal Road*
*Springfield, VA 22161*
*Telephone: 703-487-4650*

*The EPA Project Officer can be contacted at:*

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